

What is claimed is:

1. Rotary crop residue accelerating
apparatus for a vertical side discharge crop residue
5 spreader for an agricultural combine, comprising:
a rotatable member mountable in an upwardly
and forwardly open housing of the spreader for rotation
therein in a predetermined rotational direction about a
generally forwardly and rearwardly extending rotational
10 axis through a center of the rotatable member; and
a plurality of blades connected to and
supported by the rotatable member at angularly spaced
locations around the rotational axis, respectively, for
rotation with the rotatable member within the housing
15 adjacent to a forwardly and upwardly facing opening
thereof through which a downwardly directed first flow
of crop residue is to be received, each of the blades
having a surface oriented to face in the rotational
direction for propelling and accelerating the crop
20 material flow through and from the housing, and each of
the blades including a forward surface portion disposed
to rotate adjacent to a forwardly facing portion of the
opening through which a second flow of crop material is
to be received, the first surface portion including a
25 radial outer tip portion that extends radially outwardly
and forwardly from the blade and has a shape and
orientation which during the rotation will generate a
negative pressure condition in a region forwardly of the
forwardly facing opening of the housing for inducting
30 the second flow into the housing therethrough.
2. Rotary crop residue accelerating
apparatus of claim 1, wherein the radial outer tip
portion of each of the blades is curved or bent so as to
35 extend forwardly in the rotational direction and

terminates at an edge portion spaced in the rotational direction from the surface of the blade.

3. Rotary crop residue accelerating
5 apparatus of claim 1, wherein the radial outer tip
portion of each of the blades includes a radially inner
edge portion which tapers forwardly and radially
outwardly to a forwardmost edge portion of the outer tip
portion.

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4. Rotary crop residue accelerating
apparatus of claim 1, wherein the radial outer tip
portion of each of the blades is curved or bent so as to
extend forwardly in the rotational direction and
15 terminates at an edge portion spaced in the rotational
direction from the surface of the blade and oriented at
an acute angle relative to the rotational direction
greater than zero and less than about 40 degrees.

20 5. Rotary crop residue accelerating
apparatus of claim 4, wherein the edge portion is
oriented at from about a 30 to 40 degree angle relative
to the rotational direction.

25 6. Rotary crop residue accelerating
apparatus for a crop residue spreader of an agricultural
combine, the spreader including a forwardly and upwardly
open enclosure for receiving a downward flow of straw
from threshing apparatus of the combine and a lower,
30 rearward flow of lighter chaff and air from a cleaning
system of the combine, the crop residue accelerating
apparatus comprising:

a hub mountable on a rotatable member of the
spreader for rotation therewith in a predetermined

rotational direction about a generally forwardly and rearwardly extending rotational axis;

5 a plurality of blades connected to and supported by the hub at angularly spaced locations around the axis, respectively, for rotation with the hub, each of the blades having a surface oriented to face in the rotational direction including a forward surface portion, a rearward surface portion, and a mounting portion therebetween, the forward surface
10 portion terminating at a forward axial edge that extends radially outwardly and forwardly from about the hub to a forwardly extending radial outer tip portion, the radial outer tip portion having a curve or angled shape so as to extend forwardly and toward the rotational direction
15 and terminating at an edge portion spaced in the rotational direction from the surface of the blade, for generating a negative pressure condition in a region located immediately forwardly of the blade when rotated in the rotational direction for inducting the rearward
20 flow of chaff and air into a path of rotation of the blades so as to mix with the flow of straw and be accelerated by the rotating blades through and radially outwardly from the spreader.

25 7. Rotary crop residue accelerating apparatus of claim 6, wherein the radial outer tip portion of each of the blades includes a radially inner edge portion which tapers forwardly and radially outwardly to a forwardmost edge portion of the outer tip
30 portion.

8. Rotary crop residue accelerating apparatus of claim 6, wherein the radial outer tip portion adjacent to the edge portion thereof is oriented

at an acute angle relative to the rotational direction greater than zero and less than about 40 degrees.

9. Rotary crop residue accelerating
5 apparatus of claim 8, wherein the radial outer tip portion adjacent to the edge portion is oriented at from about a 30 to 40 degree angle relative to the rotational direction.

10 10. A vertical crop residue spreader for an agricultural combine, comprising:

a housing having a forwardly and upwardly facing opening for receiving a downward flow of straw from threshing apparatus of the combine and a lower,
15 rearward flow of lighter chaff and air from a cleaning system of the combine;

at least one crop residue accelerating apparatus supported for rotation within the housing, the crop residue accelerating apparatus including a central
20 hub drivingly rotatable in a predetermined rotational direction about a rotational axis therethrough oriented generally horizontally or at a small acute angle to horizontal;

a plurality of blades connected to and
25 supported by the hub at angularly spaced locations around the axis, respectively, for rotation with the hub, each of the blades having a surface oriented to face in the rotational direction including a forward surface portion, a rearward surface portion, and a
30 mounting portion therebetween, the forward surface portion terminating at a forward axial edge that extends radially outwardly and forwardly from about the hub to a forwardly extending radial outer tip portion, the radial outer tip portion being curved or angled so as to extend
35 forwardly and toward the rotational direction and

terminating at an edge portion spaced in the rotational direction from the surface of the blade, for generating a negative pressure condition in a region located immediately forwardly of the blade when rotated in the rotational direction for inducting the rearward flow of chaff and air into a path of rotation of the blades so as to mix with the flow of straw and be accelerated by the rotating blades through and radially outwardly from the spreader.

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11. The spreader of claim 10, wherein the radial outer tip portion of each of the blades of the crop residue accelerating apparatus includes a radially inner edge portion which tapers forwardly and radially outwardly to a forwardmost edge portion of the outer tip portion.

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12. The spreader of claim 10, wherein the radial outer tip portion adjacent to the edge portion of each of the blades is oriented at an acute angle relative to the rotational direction greater than zero and less than about 40 degrees.

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13. The spreader of claim 12, wherein the radial outer tip portion adjacent to the edge portion is oriented at from about a 30 to 40 degree angle relative to the rotational direction.

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